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**Draft Regulatory Analysis for Proposed Rule:  
Amendments to Material Control and Accounting  
Regulations (10 CFR Part 74)**

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**U.S. Nuclear Regulatory Commission**

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**Contents**

**Executive Summary ..... ii**

**Acronyms..... iii**

**1. Introduction..... 1**

**1.1 Statement of the Problem and Objective of the Rulemaking ..... 1**

**1.2 Background ..... 1**

**2. Identification and Preliminary Analysis of Alternative Approaches..... 2**

**2.1 Option 1: No Action..... 3**

**2.2 Option 2: Amend 10 CFR Part 74 ..... 3**

**3. Estimation and Evaluation of Values and Impacts ..... 5**

**3.1 Identification of Affected Attributes..... 5**

**3.2 Analytical Methodology ..... 7**

**3.2.1 Data and Assumptions ..... 7**

**3.3 Detailed Results ..... 8**

**4. Presentation of Results ..... 15**

**4.1 Values and Impacts..... 15**

**5. Decision Rationale..... 18**

**6. Implementation ..... 18**

**7. References ..... 18**

## Executive Summary

The U.S. Nuclear Regulatory Commission (Commission or NRC) is proposing to amend the Title 10 of the *Code of Federal Regulations* (10 CFR) Part 74 material control and accounting (MC&A) regulations applicable to special nuclear material (SNM) and some source material. This rulemaking would consolidate the MC&A requirements currently in 10 CFR Part 72 for independent spent fuel storage installations (ISFSIs) in 10 CFR Part 74. Also, 10 CFR 150.17 (applicable to licensees located in Agreement States) would be changed to conform to 10 CFR 74.13. Part 74 of 10 CFR would also be revised to include a “two-person” rule to strengthen requirements for tamper-safing, performing physical inventories, transferring SNM, or any handling of SNM that is not under an active control measure or monitoring or surveillance condition. Other miscellaneous changes would also be made to 10 CFR Part 74 requirements for Category III, II, and I facilities respectively in Subparts C, D, and E. Plain language revisions would also be made to 10 CFR Part 74. Existing NUREG guidance documents would be revised to reflect these changes and a NUREG previously un-issued guidance document for Category II facilities would also be updated and included. References to due dates and reporting frequencies would be made more uniform by expressing such times in terms of calendar days. Section 74.4 would be amended by adding, removing, and modifying certain defined terms that are used throughout 10 CFR Part 74.

The regulatory analysis examines the benefits and costs of the proposed changes to the requirements for general performance objectives; recordkeeping and submitting reports; written MC&A procedures; completing physical inventories, item controls; tamper-safing operations; two-person rule for tamper-safing, performing physical inventories, handling nuclear materials, and for transferring nuclear materials; and designating material balance areas and item control areas and custodial responsibilities for these areas. The analysis makes the following key findings:

- **Total Cost to Industry.** The proposed rule would result in a total one-time cost to licensees of approximately \$660,000 followed by total annual costs of approximately \$1.1 million. The analysis estimates the total present value of these costs at \$8.2 million (using a 7 percent discount rate) and at \$9.8 million (using a 3 percent discount rate) over the 10 year analysis period.
- **Costs to the NRC.** The rule would result in a one-time cost to the NRC of approximately \$259,420, followed by no annual costs.

**Decision Rationale.** The NRC believes that the rule is cost-justified because the proposed regulatory initiatives would update, clarify, and strengthen the existing requirements, and thereby, promote the common defense and security.

**Acronyms**

ADAMS	Agencywide Documents Access and Management System
10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
FNMC	Fundamental Nuclear Material Control
IAEA	International Atomic Energy Agency
NRC	U.S. Nuclear Regulatory Commission
SNM	Special Nuclear Material
ISFSI	Independent Spent Fuel Storage Installation
MC&A	Material Control and Accounting
NMMSS	Nuclear Materials Management and Safeguards System
NUREG	Nuclear Regulatory Publication

## **1. Introduction**

The NRC is proposing to amend the 10 CFR Part 74 MC&A regulations applicable to SNM. This rulemaking would consolidate the MC&A requirements currently in 10 CFR Part 72 for ISFSIs in 10 CFR Part 74. Also, 10 CFR 150.17 (applicable to licensees located in Agreement States) would be changed to conform to 10 CFR 74.13. No substantive changes would be involved. References to due dates and reporting frequencies would be made more uniform by expressing such times in terms of calendar days. Section 74.4 would be amended by adding, removing, and modifying certain defined terms that are used throughout 10 CFR Part 74.

This analysis presents background material, rulemaking objectives, alternatives, and input assumptions, and it describes the consequences of the rule language and alternative approaches necessary to accomplish the regulatory objectives.

The remainder of this introduction is divided into two sections. Section 1.1 states the problem and the objective of the rulemaking. Section 1.2 provides background information.

### **1.1 Statement of the Problem and Objective of the Rulemaking**

The Commission has directed the staff to revise and consolidate requirements for MC&A in 10 CFR Part 74. The MC&A requirements for an ISFSI that are currently located in 10 CFR Part 72 would be relocated in 10 CFR Part 74. In addition, 10 CFR Part 74 would be revised to make it clear what requirements apply to different types of facilities. The general provisions would be revised to include general performance objectives for the MC&A program that would apply to nearly all licensees. Some current exemptions in the regulations would be deleted or modified. Part 74 of 10 CFR would be revised to include definitions for some new terms and to clarify the definitions of some terms. Part 74 of 10 CFR would also be revised to include a “two-person” rule to strengthen requirements for tamper-safing, performing physical inventories, transferring SNM, or any handling of SNM that is not under an active control measure or monitoring or surveillance condition. Other miscellaneous changes would also be made to 10 CFR Part 74 requirements for Category III, II, and I facilities respectively in Subparts C, D, and E. Plain language revisions would also be made to 10 CFR Part 74. Existing NUREG guidance documents would be revised to reflect these changes and a NUREG guidance document for Category II facilities would be developed.

### **1.2 Background**

Many of the current MC&A requirements were developed over 20 years ago and have been considered over the past several years during self-assessment and operating experience activities completed by the NRC. A more risk-informed and performance-based approach is being considered for the requirements in 10 CFR Part 74. The previous amendments to 10 CFR Part 74 consolidated the MC&A requirements from 10 CFR Part 70. All that remains to be moved are the requirements in 10 CFR Part 72 that apply to a licensee operating an ISFSI. There are reporting requirements for the Nuclear Materials Management and Safeguards System (NMMSS) that are located in 10 CFR Part 40 for source material. These requirements would not be moved as they are not applicable for SNM. There are also NMMSS reporting requirements in 10 CFR Part 150 that apply to Agreement State licensees. These requirements would not be relocated to 10 CFR Part 74. This rulemaking would complete the relocation

process by including ISFSIs in the scope of 10 CFR Part 74 and in the requirements for submitting material status reports and nuclear material transaction reports to the NRC via the NMMSS. Comporting changes would remove the requirements from 10 CFR Part 72 and refer to the MC&A requirements in 10 CFR Part 74. The proposed reporting requirements for a licensee under 10 CFR Part 72 would be essentially unchanged except that the requirements would be located in 10 CFR Part 74.

Currently there are no requirements for general performance objectives for a licensee authorized to possess small quantities of SNM that are less than the quantities defined in § 74.4 for the term, “special nuclear material of low strategic significance.” This amendment would revise Subpart A to include general performance objectives for such a licensee. This amendment would add or modify or remove definitions to clarify 10 CFR Part 74. Newly defined terms include: *accounting, custodian, item control and item control area, material balance area, material control and accounting, and two person rule*. Modified terms include, *formula quantity, SNM of moderate strategic significance, and SNM of low strategic significance*.

For these classes of materials, 10 CFR Part 74 would be revised to improve clarity of the requirements that apply to different types of facilities. These classes of materials would be designated respectively as a Category I quantity, a Category II quantity, and a Category III quantity. Also, a new appendix would be added to 10 CFR Part 74: Appendix A, Categories of Special Nuclear Material, that includes a table showing the quantities for each category, the corresponding subpart in 10 CFR Part 74 for each category, and formulae to calculate any combination of SNM in a quantity for a category. The term, effective kilogram, would be removed from 10 CFR Part 74 and the requirements would simply refer to kilogram quantities to correct a regulatory gap that occurred in a previous rulemaking. However, the term, effective kilogram, will continue to be used in other parts of this chapter. A new requirement for item control tracking would be applied to licensees under Subpart B.

Prescriptive due dates for submitting certain reports would be replaced by a certain interval of days (e.g., 30, 45, 65, 95, 185, 275, or 370) to provide flexibility for a licensee to complete a physical inventory and submit a report. Subparts C and D would be revised to remove some exemptions or modify requirements for item control of smaller quantities of SNM. Subparts C, D, and E would be revised to require at least two, qualified and authorized individuals to complete and observe certain operations and to require certain procedures to be established for tamper-safing containers or locations and to require designation of material balance areas or item control areas. Plain language revisions would clarify an MC&A program and various systems that comprise the MC&A program. The term, MC&A plan would replace the term, Fundamental Nuclear Material Control (FNMC) plan. Conforming changes would be completed for associated guidance documents that are used by licensees and the NRC and interested members of the public.

## **2. Identification and Preliminary Analysis of Alternative Approaches**

The following sections describe the two regulatory options that the NRC is considering in order to meet the rulemaking objective identified in the previous section. Section 3 presents a detailed analysis.

## 2.1 Option 1: No Action

Under Option 1, the no-action alternative, the NRC would not amend the current regulations at 10 CFR Part 74. Current NRC regulations do not include requirements for all licensees to implement and maintain an MC&A program that enables a licensee to achieve the general performance objectives. Certain performance objectives are currently required for licensees under Subparts C, D, and E. Licensees under Subpart B are required to establish and follow written MC&A procedures but are not required to implement item controls. Licensees under Subparts C and D are exempt from tracking certain items of SNM. There is no tamper-safing requirement in Subparts C or D and licensees under Subpart E are not required to control access to unused tamper seals or account for seals. Licensees under Subparts C, D, and E are not required to designate material balance areas, item control areas, or custodians for these areas. There is no direct requirement for the two-person rule. An irradiated fuel reprocessing plant is currently exempt from the requirements under Subpart E.

The licensees would continue to comply with existing regulations. They may choose to voluntarily implement these practices that have been encouraged within the industry for many years. There are currently no facilities that are licensed to operate under Subpart D of 10 CFR Part 74. The licensees operating under Subparts C and E have already implemented best practices which are similar to the proposed changes. Option 1 would avoid costs that the proposed rule would impose; however, the existing requirements would not be updated, clarified, or consolidated to improve security issues for facilities authorized to possess and use SNM that the NRC considers necessary to assure the common defense and security. Option 1, which is the no-action alternative, is the baseline for this regulatory analysis.

## 2.2 Option 2: Amend 10 CFR Part 74

The changes listed below are consistent with Option 2 to revise and consolidate MC&A requirements in 10 CFR Part 74.

- Relocate to 10 CFR Part 74 the NMMSS-related reporting requirements for ISFSIs that currently exist in 10 CFR Part 72. These requirements in 10 CFR Part 72 duplicate requirements in existing Subpart B of 10 CFR Part 74. In this regard, revisions are proposed to 10 CFR 72.72 and 72.74; 10 CFR 72.76 and 72.78 would be removed.
- Revise 10 CFR Part 74 to make it clear what requirements apply to different types of facilities because although the Subpart B general provisions apply to almost all facilities that are authorized to possess and use SNM, some licensees and NRC staff have expressed confusion as to what requirements apply to a particular facility. To address this matter, the staff proposes to modify the 10 CFR Part 74 definitions for *formula quantity*, *SNM of moderate strategic significance*, and *SNM of low strategic significance* by conforming them to the existing definitions in 10 CFR Parts 70 and 73, which clarify these classes of SNM respectively as Category I, II, and III quantities of strategic SNM. Licensees authorized to hold Category I material are subject to the requirements in 10 CFR Part 74, Subpart E, while licensees authorized to hold Category II or III material are subject to the requirements in Subpart D or C, respectively. To further clarify these divisions, the staff proposes to add

Appendix A to 10 CFR Part 74 – a table listing the Category I, II, and III quantities of strategic SNM, and the formulae used to calculate these quantities.

- Include general performance objectives that would apply to all licensees authorized to hold SNM, rather than having such objectives apply only to licensees authorized to hold Category I, II, and III quantities of material, as is the case under the existing MC&A requirements. Examples of general performance objectives include the need to confirm the presence of SNM and to resolve indications of missing material. The general performance objectives that would apply to all licensees authorized to hold SNM are stated in proposed 10 CFR 74.3.
- Add item control requirements in proposed 10 CFR 74.19(c)(1) that would apply to all licensees authorized to hold SNM. Item control exemptions would be removed from 10 CFR 74.31(c)(6), 10 CFR 74.33(c)(6), and 10 CFR 74.43(b)(6).
- Move the exemptions for sealed sources in 10 CFR 74.31(a)(1) and 10 CFR 74.41(a)(1). These exemptions exclude sealed sources from being used in calculating whether or not a facility possesses SNM of low strategic significance or SNM of moderate strategic significance, respectively. To clarify this point, these exemptions would be moved to Appendix A.
- Remove the existing exemption in 10 CFR 74.51(a) for an irradiated fuel reprocessing plant.
- Include definitions for some new terms and to clarify the definitions of some terms. In this regard, the staff proposes to add defined terms for *accounting*, *custodian*, *item control area*, *item control system*, *material balance area*, *material control and accounting*, and *two-person rule*.
- Add requirements related to the two-person rule. Current requirements for checks and balances use the two-person rule concept for the MC&A program capabilities and for the quality assurance and accounting requirements in Subpart E at 10 CFR 74.51(b)(1) and 10 CFR 74.59 (b)(1) and (h)(3). The staff proposed to include the two-person rule in 10 CFR 74.31(c)(10), 74.33(c)(10), 74.43(c)(9), and 74.59(h)(6).
- Strengthen requirements related to tamper-indicating device programs. Having a tamper-safing program is already required in Subparts D and E at 10 CFR 74.43(c)(3) and 74.59(f)(2), respectively, and similar tamper-safing requirements would be added to Subpart C in proposed 10 CFR 74.31(c)(9) for fuel fabrication facilities using SNM of low strategic significance and 10 CFR 74.33(c)(9) for uranium enrichment facilities.

Other miscellaneous changes would be made, including plain language revisions. Such changes and revisions would replace the existing references to the FNMC Plan with references to an MC&A Plan. The staff's view is that FNMC is an outdated term and does not explicitly refer to "accounting." Thus, it does not fully describe the accounting aspects of the MC&A program. Another miscellaneous change is the proposed deletion from 10 CFR Part 74 of the defined term *Effective kilograms of special nuclear material*. This term – which is being retained in other parts of this chapter -- relates to implementation of International Atomic Energy Agency



(IAEA) requirements, but is no longer appropriate for MC&A purposes regarding facilities in the United States. The staff proposes to simply replace the term with units of grams or kilograms. The NUREG guidance documents listed below would be updated. A previously un-issued guidance document for a Category II facility would be updated and included with the guidance documents listed below.

1. NUREG-1280, Rev. 1 (1995), "Standard Format and Content Acceptance Criteria for the Material Control and Accounting (MC&A) Reform Amendment,"
2. NUREG-1065, Rev. 2 (1995), "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Facilities,"
3. NUREG/CR-5734 (1991), "Recommendations to the NRC on Acceptable Standard Format and Content for the Fundamental Nuclear Material Control (FNMC) Plan Required for Low-Enriched Uranium Enrichment Facilities,"
4. NUREG/BR-0096(1992), "Instructions and Guidance for Completing Physical Inventory Summary Report."

Licensees with Category I, II, or III facilities would need to revise the MC&A program to address new requirements, including new performance objectives. In this regard, it is anticipated that many of the licensees that would be affected by this rulemaking would need to follow the license change process of 10 CFR 70.32(c), and determine whether a license amendment application needs to be submitted as part of making revisions to the MC&A program. Section 70.32(c)(iii) states that the licensee shall make no change that would decrease the effectiveness of the MC&A program. The changes in this rulemaking are intended to consolidate MC&A requirements in 10 CFR Part 74 and to clarify, revise, modify, and strengthen the existing requirements. Licensees who determine that no revisions to the MC&A program are needed would not be required to resubmit their MC&A plans for approval as a condition of continuing operations.

The NRC has estimated the benefits and costs of this option, as described in Sections 3 and 4 of this regulatory analysis, and has pursued Option 2 for the reasons discussed in Section 5.

### **3. Estimation and Evaluation of Values and Impacts**

This section describes the analysis that the NRC conducted to identify and evaluate the benefits (values) and costs (impacts) of the two regulatory options. Section 3.1 identifies the attributes that the staff expects the proposed rulemaking to affect. Section 3.2 describes how the values and impacts have been analyzed. Finally, Section 3.3 presents the detailed results of the projected impacts.

#### **3.1 Identification of Affected Attributes**

This section identifies the factors within the public and private sectors that the final rule is expected to affect, using the list of potential attributes in Chapter 5 of NUREG/BR-0184,

“Regulatory Analysis Technical Evaluation Handbook,” issued January 1997, and in Chapter 4 of NUREG/BR-0058, “Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission,” Revision 4, issued September 2004. The evaluation considered each attribute listed in Chapter 5 of NUREG/BR-0184. The basis for selecting those attributes is presented below.

Affected attributes include the following:

- **Industry Implementation.** The proposed changes would require certain licensees to implement general performance objectives, establish and follow written MC&A procedures, implement an item control system, implement a two-person rule for certain operations such as tamper-safing of containers or vaults, and designate material balance areas and/or item control areas and custodial responsibilities for these areas. Certain items currently exempted from an item control program would be subject to item controls. An irradiated fuel reprocessing plant would no longer be exempted from the requirements for a Category I facility in 10 CFR Part 74, Subpart E.
- **NRC Implementation.** Under the proposed action, the NRC would develop the proposed rule package to be published by the Office of the *Federal Register* and prepare the final rule package that responds to comments from stakeholders and sets forth the final rule text for publication by the Office of the *Federal Register*. The NRC would revise guidance and inspection procedures to accommodate the requirements that would be added or modified by the rulemaking process.
- **Industry Operations.** The proposed changes would require certain licensees to maintain their newly established item control system and to conduct physical inventories. Licensees would maintain the two-person rule by ensuring that individuals are qualified and authorized to perform and observe certain MC&A operations. Licensees would maintain material balance areas and/or item control areas and ensure custodial responsibilities are assigned to these areas. Certain items currently exempted from item control requirements would be tracked to maintain current knowledge of each item.
- **NRC Operations.** The proposed changes would include inspection and enforcement of requirements for certain licensees to adequately assure common defense and security of workers and members of the public from lost, missing, stolen, or diverted SNM. Inspectors would assess licensee implementation of the requirements noted above and operational activities noted above to maintain the MC&A program at licensee facilities. The NRC does not estimate any additional operating cost due to the proposed regulations because the routine inspection program is reviewed and updated at 3-year intervals and the proposed changes would be incorporated without increasing cost to the NRC to update procedures. The NRC inspection activities at a facility would include the proposed changes without increasing inspection effort.
- **Safeguards and Security Considerations.** The regulatory basis for 10 CFR Part 74 is security and the information and data and activities to manage the information and data are subject to the safeguards requirements in 10 CFR Part 73. Therefore, all the

proposed changes would affect the current safeguards and security programs that have been implemented by the licensees that hold SNM.

Attributes that the rulemaking options would *not* affect include the following: occupational health (routine), occupational health (accidents), public health (routine), public health (accidents), regulatory efficiency, environmental considerations, general public, improvements in knowledge, offsite property, onsite property, antitrust considerations, and other Government regulations.

### **3.2 Analytical Methodology**

This section describes the methodology used to analyze the consequences associated with the proposed rule. The values (benefits) include any desirable changes in the affected attributes. The impacts (costs) include any undesirable changes in the affected attributes.

As described in Section 3.1, the attributes expected to be affected include the following:

- Industry implementation
- Industry operation
- NRC implementation
- NRC operations
- Safeguards and security considerations

This analysis relies on a qualitative evaluation of one of the affected attributes (safeguards and security considerations) due to the difficulty in quantifying the impact of the current rulemaking. This attribute would be affected by the regulatory options through the associated reduction in the risks of damage from malevolent use of SNM. Quantification would require estimation of factors such as: (1) the frequency of attempted theft or diversion, (2) the frequency with which theft or diversion attempts are (i.e., pre-rule) and will be (i.e., post-rule) successful, and (3) the impacts associated with successful theft or diversion attempts.

The NRC collected input assumptions using data and information from NRC workgroups and staff experience and NRC databases to estimate the costs associated with implementation and costs associated with annual operations of industry and the NRC.

In accordance with guidance from the Office of Management and Budget and NUREG/BR-0058, Revision 4, this regulatory analysis presents the results of the analysis using both 3-percent and 7-percent real discount rates. The NRC seeks public comments on the accuracy of these regulatory analysis assumptions and on the validity of the proposed rule's value and impact estimation methods.

#### **3.2.1 Data and Assumptions**

The analysis assumes that one-time implementation costs will be incurred in calendar year 2013. The analysis assumes that ongoing costs to revise and consolidate requirements for MC&A in 10 CFR Part 74 related to the proposed rule will begin in 2013 and will be modeled on an annual cost basis. The analysis calculated cost and savings over a 10-year time horizon with each year's costs or savings discounted back at a 7-percent and 3-percent discount rate in

accordance with NUREG/BR-0058, Revision 4. Costs and savings are expressed in 2011 dollars.

### **Data/Affected Entities**

The analysis makes the following assumptions regarding the entities affected (licensees): The NRC staff estimates that the following existing facilities will be impacted by this rule:

- ISFSI
- Category III- Fuel Fabrication Facility
- Category III- Enrichment Facility
- Category I- Fuel Fabrication Facility
- 10 CFR Part 70 licensees authorized for academic, research, and industrial uses of SNM
- 10 CFR Part 50 licensees authorized to operate a commercial nuclear power reactor or research and test reactor
- 10 CFR Part 52 licensees authorized to store unirradiated fuel elements containing SNM

Within the next 10 years, the NRC expects to receive and review an application for a medical isotope production facility. Such a facility, if licensed, would likely be a Category II facility.

### **Other Data and Assumptions**

The analysis makes the following other assumptions:

- The analysis assumes that the labor rate for the NRC staff is \$119 per hour.
- The analysis assumes a \$100 per hour labor rate for licensee nonsecurity-related personnel.
- The analysis assumes that the final rule will be published in December 2012 and would be effective in mid-2013.
- The analysis calculated cost over a 10-year timeframe with each year's costs or savings discounted back at a 7-percent and 3-percent discount rate, in accordance with NUREG/BR-0058, Revision 4.
- To the extent practical, quantitative information (e.g., costs and savings) and qualitative information (e.g., the nature and magnitude of impacts) on attributes affected by the rule were obtained from, or developed in consultation with, the NRC staff.

### **3.3 Detailed Results**

This section presents a detailed estimate of the impacts for the proposed rulemaking (Option 2). Some values and impacts are addressed qualitatively for reasons discussed in Section 3.2. Exhibits 3-1 and 3-2 summarize these results.

**Option 1: No Action**

By definition, this option does not result in any values or impacts.

**Option 2: Amend Regulations to Revise and Consolidate Requirements for MC&A of SNM in 10 CFR Part 74**Industry Implementation

Impact: Establish, Maintain Written MC&A Procedures

The proposed changes to 10 CFR 74.19(b)(1) would require each licensee authorized to possess SNM, at any one time and site location, in a quantity of 350 grams or more of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to establish, maintain, and follow written MC&A procedures that are sufficient to enable the licensee to account for the SNM in its possession under the license. It is estimated by the NRC that the changes would not impact any additional licensees. The NRC staff compared the current number of licensees subject to the current requirement with the number of licensees that would be subject to the proposed requirement which would reduce the threshold possession limit from one effective kilogram of SNM to 350 grams or more of contained uranium-235, uranium-233, or plutonium, or any combination thereof and determined that no additional licensees would be affected by proposed 10 CFR 74.19(b)(1).

Impact: Item Control System

The proposed changes to 10 CFR 74.19(c)(1) would require each licensee authorized to possess SNM, at any one time and site location, in any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to establish, document, implement, and maintain an item control system as defined in § 74.4. The NRC estimated the proposed change to lower the threshold limit from 350 grams to any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof would impact 25 licensees that do not currently have an item control system because the number of items they possess is small and the number of transactions for their inventory is also small. To establish and maintain an item control system the staff estimated about 5 labor hours would be needed. The labor rate is \$100 per hour. The one time cost per licensee would be \$500 and the total one time cost to the industry would be \$12,500.

The proposed changes to 10 CFR 74.19(c)(2) would require each licensee authorized to possess SNM, at any one time and site location, in any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to conduct a physical inventory at intervals not to exceed 370 calendar days. The NRC estimated the proposed change to lower the threshold limit from 350 grams to any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof would impact 5 licensees that do not currently conduct a physical inventory. The implementation time would be 5 hours at \$100 per hour. The one-time cost per licensee would be \$500 and the total one-time cost to the industry would be \$2,500.

**Impact: Item Control Exemptions for Category III and II Facilities**

The proposed changes to 10 CFR 74.31(c)(6) would require each Category III fuel fabrication facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for 14 days or less and individual items containing less than 500 grams of uranium-235 up to a total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact the three licensees that are currently operating Category III fuel fabrication facilities. The implementation time would be 250 hours at \$100 per hour. The one-time cost per licensee would be \$25,000 and the total one-time cost to the industry would be \$75,000.

The proposed changes to 10 CFR 74.33(c)(6)(ii) would require each Category III enrichment facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for less than 14 days and individual items containing less than 500 grams uranium-235 up to a cumulative total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two potential licensees that are constructing enrichment facilities that will be licensed to operate in the future. The implementation time would be 250 hours at \$100 per hour. The one-time cost per licensee would be \$25,000 and the total one-time cost to the industry would be \$100,000.

The proposed changes to 10 CFR 74.43(b)(6) would require any future Category II facility to include currently exempted items in their item control system. The currently exempted items include items that exist for less than 14 calendar days and individual items containing less than 200 grams of plutonium or uranium-233 or 300 grams or more of uranium-235 up to a total of one formula of kilogram of strategic SNM or 17 kilograms of uranium-235 contained in uranium enriched to 10.00 percent or more but less than 20.00 percent in the uranium-235 isotope. It is estimated by the NRC that the changes would impact one potential licensee (e.g., a medical isotope production facility could be operating within 10 years) and the implementation time would be 250 hours at \$100 per hour. The total one-time cost to the licensee and the industry would be at \$25,000.

**Impact: Two- Person Rule**

The proposed changes to 10 CFR 74.31(c)(10) would require each Category III fuel fabrication licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact the three licensees that are currently operating these Category III facilities. The implementation time would be 500 hours to train the workers. The one-time cost of training at \$100 per hour would be \$50,000 per licensee and the total one-time cost to the industry would be \$150,000.

The proposed changes to 10 CFR 74.33(c)(10) would require each uranium enrichment licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two



potential licensees that are constructing enrichment facilities that will be licensed to operate within 10 years. The implementation time to train the workers would be 500 hours. The one-time cost at \$100 per hour would be \$50,000 per licensee and the total one-time cost to the industry would be \$200,000.

The proposed changes to 10 CFR 74.43(c)(9) would require any future Category II licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact one potential licensee and the implementation time would be 500 hours to train the workers. The one-time cost to the licensee and the industry would be \$50,000.

The proposed changes to 10 CFR 74.59(h)(6) would require each Category I fuel cycle licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact the two licensees that are currently operating the Category I facilities and the potential licensee that would operate the mixed oxide (MOX) facility. The implementation time would be 150 hours to train the workers. The training time would be less than a Category III or II facility because many operations in a Category I facility are already performed under a two-person rule concept that is similar to the proposed two-person rule. The one-time cost at \$100 per hour would be \$15,000 per licensee and the total one-time cost for the industry would be \$45,000.

### NRC Implementation

Impact: Develop Rule Package and Revise Guidance Documents

The NRC staff would develop the rule package and revise guidance and inspection procedures to accommodate the requirements that would be added or modified by the rulemaking process. This is an estimated \$259,420 one-time cost to the NRC. This effort will require one-half of a full-time equivalent position (FTE) for participating in the rulemaking activities and one-half FTE to revise and update the guidance documents.

### Industry Operation

Impact: Item Control System

The proposed changes to 10 CFR 74.19(c)(1) would require each licensee authorized to possess SNM, at any one time and site location, in a quantity of 350 grams or more of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to establish, document, implement, and maintain an item control system as defined in § 74.4. The NRC estimated the proposed change to lower the threshold limit from 350 grams to any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof would impact 25 licensees that do not currently have an item control system because the number of items they possess is small and the number of transactions for their inventory is also small. The annual time to perform these actions would be 3 hours per licensee. The annual cost at \$100 per hour would be \$300 per licensee and the total annual cost to the industry would be \$7,500.

The proposed changes to 10 CFR 74.19(c)(2) would require each licensee authorized to possess SNM, at any one time and site location, in any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to conduct a physical inventory at intervals not to exceed 370 calendar days. The NRC estimated the proposed change to lower the threshold limit from 350 grams to any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof would impact five licensees that do not currently conduct a physical inventory. The annual time would be 10 hours at \$100 per hour. The annual cost per licensee would be \$1000 and the total annual cost to the industry would be \$5000.

Impact: Recordkeeping

The proposed changes to 10 CFR 74.19(c)(3) would require each licensee authorized to possess SNM, at any one time and site location, in any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof, to keep records of a physical inventory at intervals not to exceed 370 calendar days. The NRC estimated the proposed change to lower the threshold limit from 350 grams to any quantity of contained uranium-235, uranium-233, or plutonium, or any combination thereof would impact five licensees that do not currently keep records of a physical inventory. The annual time would be 1 hour at \$100 per hour. The annual cost per licensee would be \$100 and the total annual cost to the industry would be \$500.

Impact: Item Control Exemptions for Category III and II Facilities

The proposed changes to 10 CFR 74.31(c)(6) would require each Category III fuel fabrication facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for 14 days or less and individual items containing less than 500 grams of uranium-235 up to a total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact these three licensees that are currently operating the Category III facilities. The annual time would be 100 hours. The annual cost at \$100 per hour would be \$10,000 per licensee and the total annual cost to the industry would be \$30,000.

The proposed changes to 10 CFR 74.33(c)(6)(ii) would require each Category III enrichment facility to include currently exempted items in their item control system. The currently exempted items that a licensee would be required to track include items that exist for less than 14 days and individual items containing less than 500 grams uranium-235 up to a cumulative total of 50 kilograms of uranium-235. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two potential licensees that are constructing enrichment facilities that will be licensed to operate in the future. The annual time would be 100 hours at \$100 per hour. The annual cost per licensee would be \$10,000 and the total annual cost to the industry would be \$40,000.

The proposed changes to 10 CFR 74.43(b)(6) would require any future Category II facility to include currently exempted items in their item control system. The currently exempted items include items that exist for less than 14 calendar days and individual items containing less than 200 grams of plutonium or uranium-233 or 300 grams or more of uranium-235 up to a total of one formula of kilogram of strategic SNM or 17 kilograms of uranium-235 contained in uranium enriched to 10 percent or more but less than 20 percent in the uranium-235 isotope. It is



estimated by the NRC that the changes would impact one potential licensee and the annual time would be 100 hours at \$100 per hour. The annual cost to the licensee and the industry would be \$10,000.

#### Impact: Two-Person Rule

The proposed changes to 10 CFR 74.31(c)(10) would require each Category III fuel fabrication licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact the three licensees that are currently operating the Category III facilities. The annual time would be 1,500 labor hours each to assign at least two qualified and authorized individuals to prevent collusion and ensure that correct procedures are used, the operations are completed correctly, and that information about the operation is accurately documented. The annual cost at \$100 per hour would be \$150,000 per licensee and the total annual cost to the industry would be \$450,000.

The proposed changes to 10 CFR 74.33(c)(10) would require each uranium enrichment licensee to use the two-person rule (as defined in § 74.4) for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact two licensees that are operating enrichment facilities and two potential licensees that are constructing enrichment facilities that will be licensed to operate within 10 years at 500 labor hours each to assign at least two qualified and authorized individuals to prevent collusion and ensure that correct procedures are used, the operations are completed correctly, and that information about the operation is accurately documented. The annual cost at \$100 per hour would be \$50,000 per licensee and the total annual cost to the industry would be \$200,000.

The proposed changes to 10 CFR 74.43(c)(9) would require any future Category II licensee to use the two-person rule (as defined in § 74.4) for tamper-safing operations, for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. The NRC estimates this will impact one potential licensee at 1,000 labor hours to assign at least two qualified and authorized individuals to prevent collusion and ensure that correct procedures are used, the operations are completed correctly, and that information about the operation is accurately documented. The annual cost at \$100 per hour would be \$100,000 for the licensee and the annual cost to the industry would be \$100,000.

The proposed changes to 10 CFR 74.59(h)(6) would require each Category I fuel cycle licensee to use the two-person rule (as defined in § 74.4) for tamper-safing operations, for conducting tamper-safing operations, physical inventories, transfer of SNM, and for any handling of SNM that is not under an active control measure or monitoring or surveillance condition. It is estimated by the NRC that the changes would impact the two licensees that are currently operating the Category I facilities and the potential licensee that would operate the MOX facility. The annual time would be 750 labor hours for each licensee to assign at least two qualified and authorized individuals to prevent collusion and ensure that correct procedures are used, the operations are completed correctly, and that information about the operation is accurately

documented. The annual cost at \$100 per hour would be \$75,000 per licensee and the total annual cost to the industry would be \$225,000.

Impact: Removal of exemption in 10 CFR 74.51(a) for an irradiated fuel reprocessing plant

This proposed change would impact no licensees, because there are currently no operating irradiated fuel reprocessing plants.

#### NRC Operation

Impact: The amount of NRC inspection effort would not change. Inspectors would evaluate licensee implementation of the changes within the scope of the routine inspection program elements. The inspection procedures would be updated within the normal review and revision cycle at 3-year intervals. The procedures were revised in December 2010 and would be reviewed and updated in 2013 which would coincide with the issuance of the final rule.

**Exhibit 3-1**  
**Quantitative Results**  
**Total Present Value for the Cost**

	One-time Implementation Costs	Annual Operating Costs	Total Combined Implementation and Annual Cost for 10-year Period at 3% Discount Rate	Total Combined Implementation and Annual Cost for 10-year Period at 7% Discount Rate
Industry Costs	\$660,000	\$1,068,000	\$9,770,257	\$8,161,185
NRC Costs	\$259,420	\$0	\$259,420	\$259,420
Total	\$919,420	\$1,068,000	\$10,029,677	\$8,420,605

**Exhibit 3-2**  
**Detailed Quantitative Results: Licensee Costs**

Citation	Description	Number of Licensees Affected	Labor Rate \$/hr	Annual Hours per Licensee	Annual Cost per Licensee	Total Annual Cost	One Time Implementation Cost per Licensee	Total One-Time Cost
74.19(b)(1)	Written MC&A Procedures	0						
74.19(b)(2)	Recordkeeping	0						
74.19(b)(3)	Recordkeeping	0						
74.19(c)(1)	Item Control System	25	\$100	3	\$300	\$7,500	\$500	\$12,500
74.19(c)(2)	Physical Inventory	5	\$100	10	\$1,000	\$5,000	\$500	\$2,500
74.19(c)(3)	Physical Inventory Recordkeeping	5	\$100	1	\$100	\$500	\$0	\$0
74.31(c)(6)	Item Control Exemptions	3	\$100	100	\$10,000	\$30,000	\$25,000	\$75,000
74.33(c)(6)(ii)	Item Control Exemptions	4	\$100	100	\$10,000	\$40,000	\$25,000	\$100,000
74.43(b)(6)	Item Control Exemptions	1	\$100	100	\$10,000	\$10,000	\$25,000	\$25,000
74.31(c)(10)	Two-Person Rule	3	\$100	1,500	\$150,000	\$450,000	\$50,000	\$150,000
74.33(c)(10)	Two-Person Rule	4	\$100	500	\$50,000	\$200,000	\$50,000	\$200,000
74.43(c)(9)	Two-Person Rule	1	\$100	1,000	\$100,000	\$100,000	\$50,000	\$50,000
74.59(h)(6)	Two-Person Rule	3	\$100	750	\$75,000	\$225,000	\$15,000	\$45,000
Total						\$1,068,000		\$660,000

## **4. Presentation of Results**

### **4.1 Values and Impacts**

This section summarizes the values (benefits) and impacts (costs) estimated for these regulatory options. (Section 3.3 presents a more detailed analysis.) To the extent that the affected attributes could be analyzed quantitatively, the net effect of each option has been calculated and is presented below. However, some values and impacts could be evaluated only on a qualitative basis.

The benefits of this proposed rule are associated with safeguards and security considerations and the decreased risk of a security-related event, such as theft, diversion, or radiological sabotage of SNM and subsequent use for malevolent purposes. The values and impacts of the proposed changes that are nonquantifiable would improve a licensee's capabilities to deter and detect any loss, theft, diversion, or misuse of SNM that could result in a malevolent event. The proposed changes would promote the common defense and security of SNM.

Exhibit 4-1 summarizes the results of the value-impact analysis. Relative to the no-action alternative (Option 1), Option 2 would result in a net quantitative impact estimation of approximately \$10,000,000 at a 3-percent discount rate and \$8,400,000 at a 7-percent discount rate.

**Exhibit 4-1**  
**Summary of Impacts at Discount Rates of 3 Percent and 10 Percent for a 10-Year Period**

<b>Attribute</b>	<b>One-time Implementation Costs</b>	<b>Annual Operating Costs</b>	<b>Total Combined Implementation and Annual Cost for 10-year Period at 3% Discount Rate</b>	<b>Total Combined Implementation and Annual Cost for 10-year Period at 7% Discount Rate</b>
Industry Implementation	\$660,000		\$660,000	\$660,000
Industry Operation		\$1,068,000	\$9,110,257	\$7,501,185
Industry Total Costs			\$9,770,257	\$8,161,185
NRC Implementation	\$259,420		\$259,420	\$259,420
NRC Operation				
NRC Total Costs			\$259,420	\$259,420
<b>Total</b>	<b>\$919,420</b>	<b>\$1,068,000</b>	<b>\$10,029,677</b>	<b>\$8,420,605</b>

## **5. Decision Rationale**

The changes in this rulemaking are intended to consolidate MC&A requirements in 10 CFR Part 74 and to clarify, revise, modify, and strengthen the existing requirements. The decision rationale is based on how the values and impacts have been analyzed. Relative to the no-action alternative, Option 2 would result in a net cost estimated at approximately \$8,400,000 assuming a 7-percent discount rate, or approximately \$10,000,000 assuming a 3-percent discount rate. Offsetting the net cost, the NRC believes that Option 2 would result in substantial non-quantifiable benefits related to safety and security. Although costs are incurred as a result of the rule, the qualitative benefits associated with the rule outweigh its cost. The NRC believes that the rule is cost-justified because the proposed regulatory initiatives would promote the common defense and security of SNM.

## **6. Implementation**

The staff proposes to make the final rule effective 90 days after its publication in the FR. For this analysis, the final rule effective date is mid-2013.

## **7. References**

- NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook, Final Report," U.S. Nuclear Regulatory Commission, Washington, DC, January 1997.
- NUREG/BR-0058, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," Revision 4, U.S. Nuclear Regulatory Commission, Washington, DC, September 2004.
- SECY-08-0059, Rulemaking Plan: Part 74 - Material Control and Accounting of Special Nuclear Material, April 25, 2008.